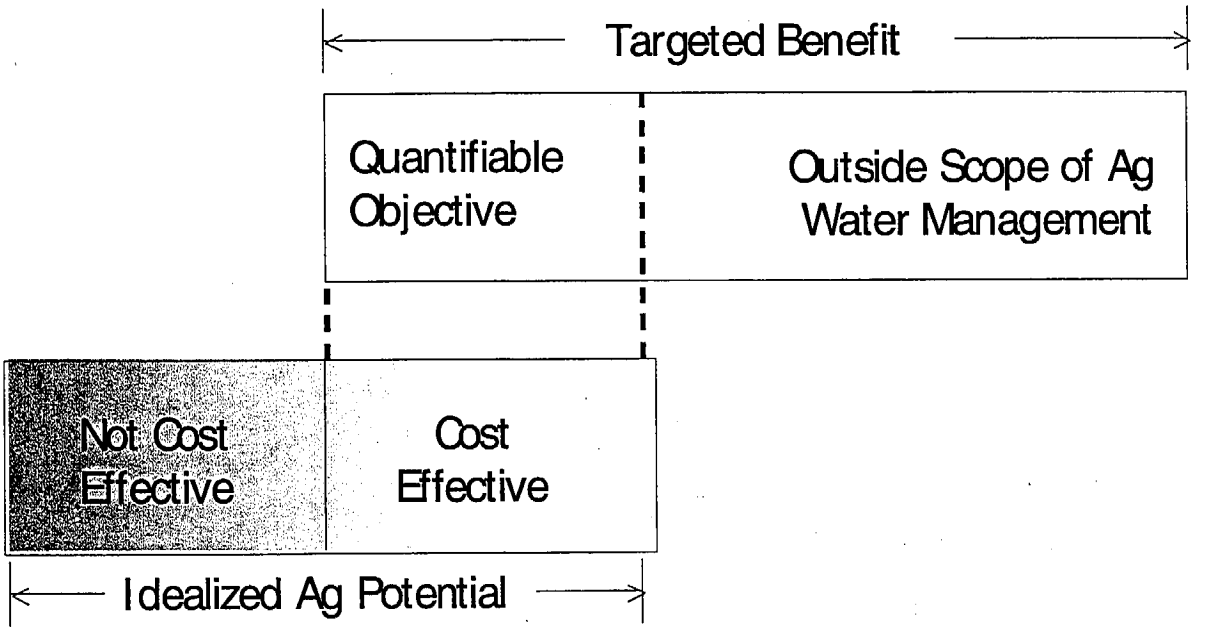
Attachment C

Explanation and Examples of Targeted Benefits And Quantifiable Objectives



CALFED
Agricultural Water Use Efficiency

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Draft
Agricultural Water Use Efficiency
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I. Introduction

Background

The CALFED Bay-Delta Program is a cooperative effort among state and federal agencies and the public to ensure a healthy ecosystem, reliable water supplies, good quality water, and stable levees in California's Bay-Delta system. One of the Program elements common to the potential solutions developed by CALFED is Water Use Efficiency (WUE). The CALFED WUE Program is unique nationally in its magnitude and its aggressive approach to water management. The WUE program is organized into agricultural, urban, recycling and managed wetlands categories, but this document focuses solely on Agriculture Water Use Efficiency (Ag WUE).

The Ag WUE element was developed in cooperation with a steering committee made up of agencies with regulatory responsibilities for Delta water, and agricultural and environmental stakeholders. Built on the concept of thinking globally (the health and functionality of the entire Bay-Delta system) and acting locally (within the communities whose practices impact that system), Ag WUE leverages the efforts of existing, locally-governed organizations to create locally defined actions in response to CALFED's centrally developed objectives. These objectives drive the Ag WUE element, fostering cooperation among the stakeholders to create locally designed and initiated solutions to Delta problems and overcome barriers to adoption of more efficient water management practices.

Ag WUE's foundation is built on three equally important concepts: 1) incentive based actions, 2) quantified objectives and 3) locally driven leadership. These concepts are mortared together by continuous monitoring and adaptive management. In practice, this translates to a program built on solid theory and science, grounded in practical experience, and is able to constantly test its hypotheses and alter its path in response the real world experiences of its implementers, both at the administrative and on-the-ground levels.

Locally Cost-Effective Implementation

Very little will be discussed about the Water Use Efficiency Program without invoking the words "cost-effective." Implementation of locally cost-effective water use efficiency practices is a fundamental building block of the WUE element. By definition, locally cost-effective practices are those for which the water supplier or user receives benefits in excess of their costs. CALFED expects local entities (as the primary beneficiaries) to fund these practices. CALFED intends to facilitate implementation of these practices through cooperation with the Agricultural Water Management Council (AWMC), technical assistance and low interest loans.

When Ag WUE's projects or priorities are *not* locally cost effective, but are cost-effective when viewed from a statewide perspective, CALFED anticipates providing State and Federal assistance in the form of incentive grants. The proposed grant program will tailor the amount of local cost share (if any) on a project-by-project basis to reflect the level of local benefits.

Targeted Benefits and Quantifiable Objectives.

In defining Ag WUE, CALFED has taken a major step forward by developing Targeted Benefits. A Targeted Benefit is a quantified region-specific expression of a CALFED objective that could be partially addressed through Ag WUE. Objectives are related to improving water quality, quantity, timing and instream flow. Although each Targeted Benefit can be partially addressed through Ag WUE, it is possible that it can only be fully achieved through means that fall outside the category of agricultural water management (Figure 1).

The Ag WUE contribution to a given targeted benefit is estimated through an analysis of flowpaths and resource economics. The result of this analysis is a range of quantifiable objectives which represent the practical, cost effective (from the State-wide perspective) contribution Ag WUE can make towards achieving the Targeted Benefit (Figure 2).

Incentive-Driven Local Actions.

The WUE program looks to agricultural regions for the solutions to the Bay Delta's problems. Rather than imposing top-down, one-size-fits-all requirements, the Program relies on incentives to encourage local entities to identify and implement creative actions to achieve the Targeted Benefits and Quantifiable Objectives in a cost-effective manner. CALFED will use a competitive grant/loan program as the best mechanism to assure that the investments in water use efficiency are cost effective. Regional differences will dictate that the exact cost-effective measures will vary according to local need and situation, but the competitive nature of the program would fund the most cost-effective measures for a given locale first.

Monitoring and Adaptive Management.

Adaptive management strategies will be combined with a vigorous monitoring and evaluation component of all CALFED-funded WUE actions. These monitoring efforts will verify and refine the WUE conceptual model and provide timely and effective reaction to unforeseen conditions and events.

Anticipated Funding.

During the first four years of Stage 1, CALFED proposes State and Federal government investment of $500 million (1/2 state and 1/2 federal) into Water Use Efficiency, with an additional $500 million coming from local matching funds. CALFED expects to direct a substantial amount of this funding commitment to the Agricultural WUE program. At the end of the first four years of its Implementation Phase, CALFED will prepare a more comprehensive evaluation of WUE program implementation. At that time, CALFED may increase or reduce its targeted conservation goals to reflect actual implementation experience and redirect investments

to achieve the most effective water use efficiency results. CALFED may also introduce new programs if necessary and appropriate.

Purpose of this Document

This document is intended to provide an overview of CALFED's Ag WUE element, with explanation and examples of its key concepts and impact area. It is not intended to provide a comprehensive methodology of the work done to create the program. This document explains the concepts of Targeted Benefits and Quantifiable Objectives to provide the public with an opportunity to familiarize themselves with the nature and progress of WUE's work to date. CALFED plans to produce a more thorough methodology as part of a peer review of Quantifiable Objectives in late July, 2000.

Figure 1. Targeted Benefit Schematic.

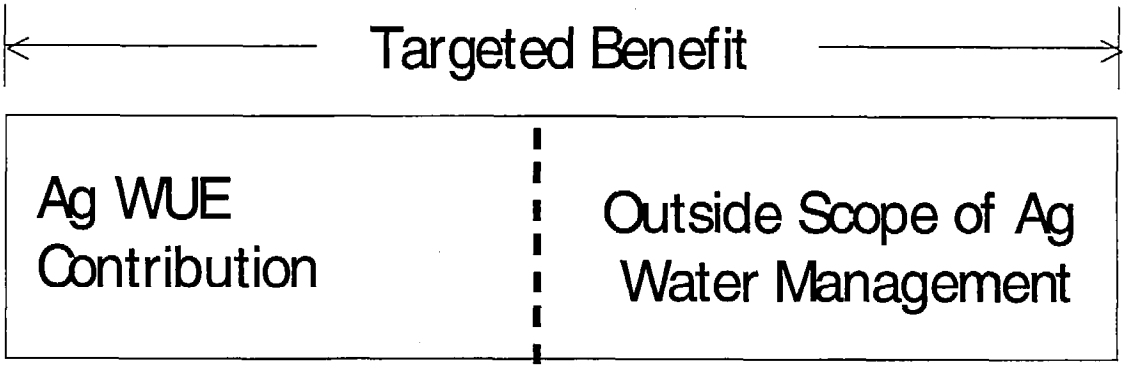
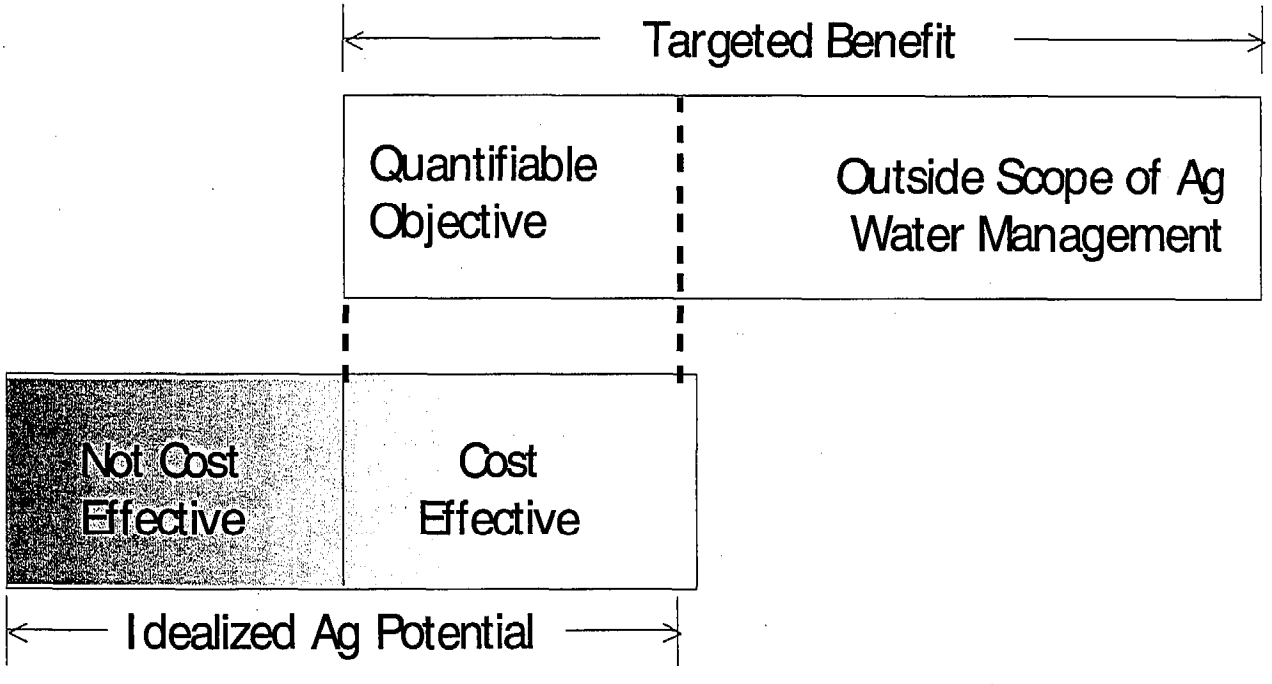


Figure 2. Quantifiable Objective is the Cost-Effective Ag WUE Contribution to a Targeted Benefit



II. Central Valley Water Balance Information

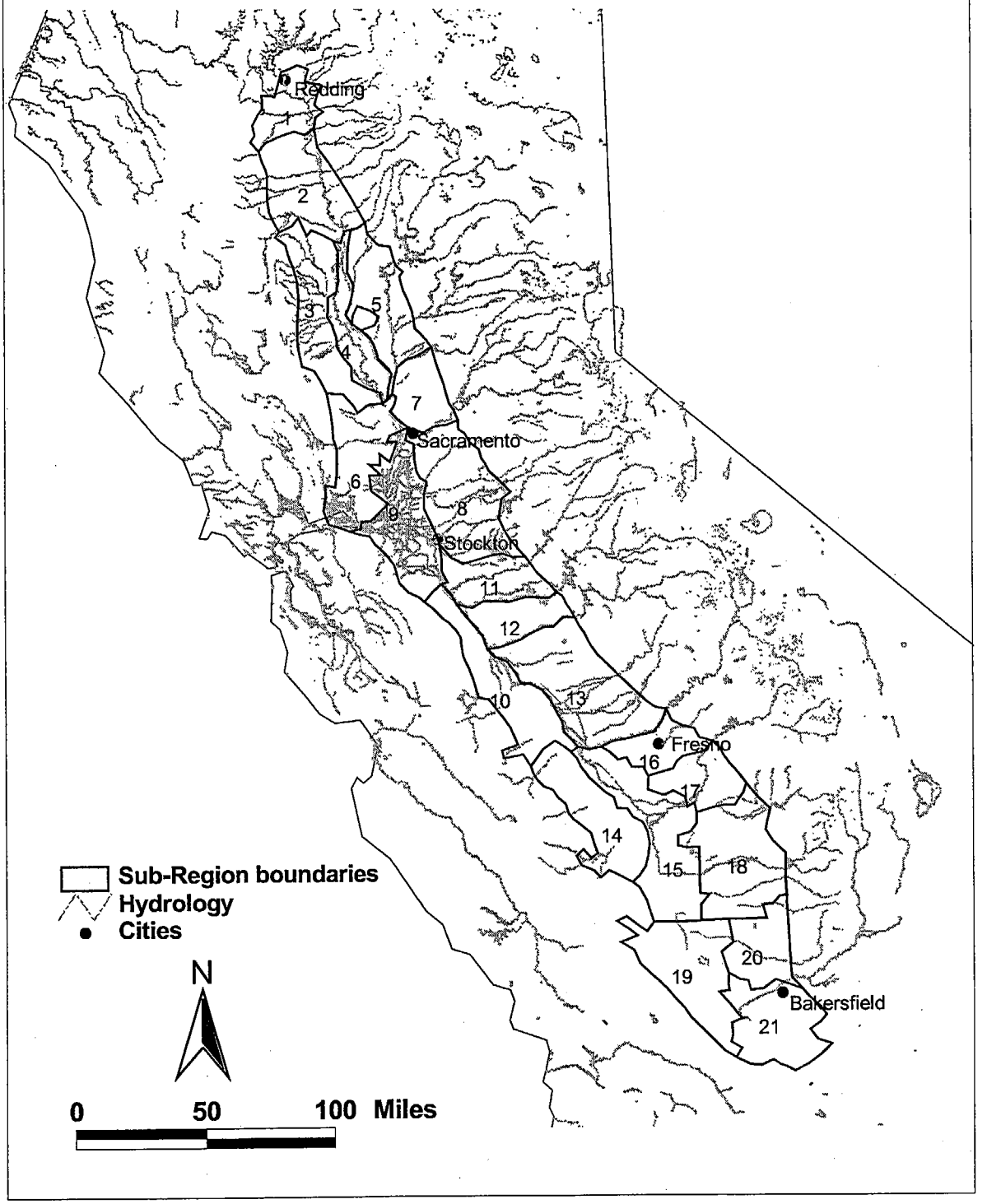
The Central Valley of California is an alluvial plain that extends from Redding in the north to Bakersfield in the south, encompassing approximately 20,000 square miles. Surrounded by the Klamath, Cascade and Sierra Nevada mountain ranges, and drained by the Sacramento River, the Sacramento Valley forms the northern portion of the Central Valley. The San Joaquin Valley makes up the southern portion of the Central Valley and is bounded on the east by the Sierra Nevada and on the west by the Coast Ranges. Two geologic features define the San Joaquin Valley: the San Joaquin Basin, drained by the San Joaquin River and the Tulare Basin, a hydrologically closed basin partially drained by the San Joaquin River in extremely wet years.

The primary data source for the Quantifiable Objectives computations is the USBR's Central Valley Ground and Surface Water Model (CVGSM). The CVGSM data set was chosen because it provides a comprehensive and systematic view of both the land and water use in the Central Valley. The model divides the Central Valley into 21 geographic Sub-Regions (Fig. 3) and the same divisions are used to organize this document. Within the CVGSM, information is available about Land Use (Fig. 4), Cropping Patterns (Fig. 5), and overall water balance (Fig. 6). The Land Use and Cropping Patterns are based on the "recent land use information" (Central Valley Project – Programmatic Environmental Impact Statement, 1999).

The CVGSM data set was compiled from several sources including the California Department of Water Resources (DWR) Detailed Analysis Unit (DAU) structure, the United States Geological Survey (USGS) streamflow gauging stations and USBR and Department of Water Resources diversion data. Figures 3-6 are included to provide an overview of the data used to develop Quantifiable Objectives.

Table 1 lists the abbreviated categories of Targeted Benefits and provides a snapshot of the Targeted Benefits in each sub-region. Each check mark (✓) in this Table represents one or more Targeted Benefit for the given Sub-Region.

Figure 3. Sub-Region Boundaries
Central Valley Ground and Surface Water Model



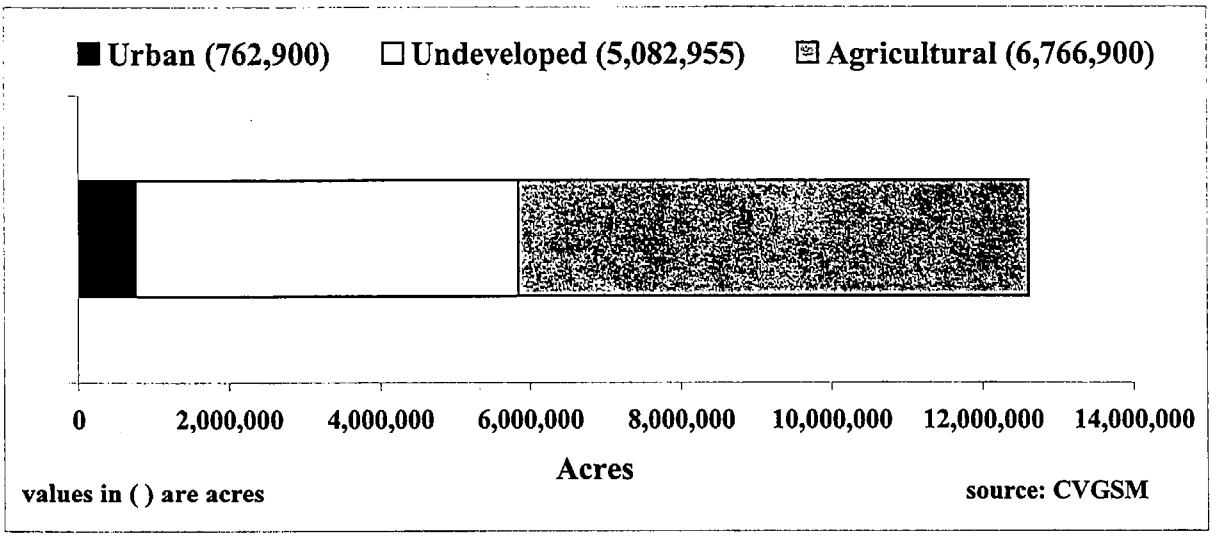


**Figure 4. Land Use,
Central Valley.**

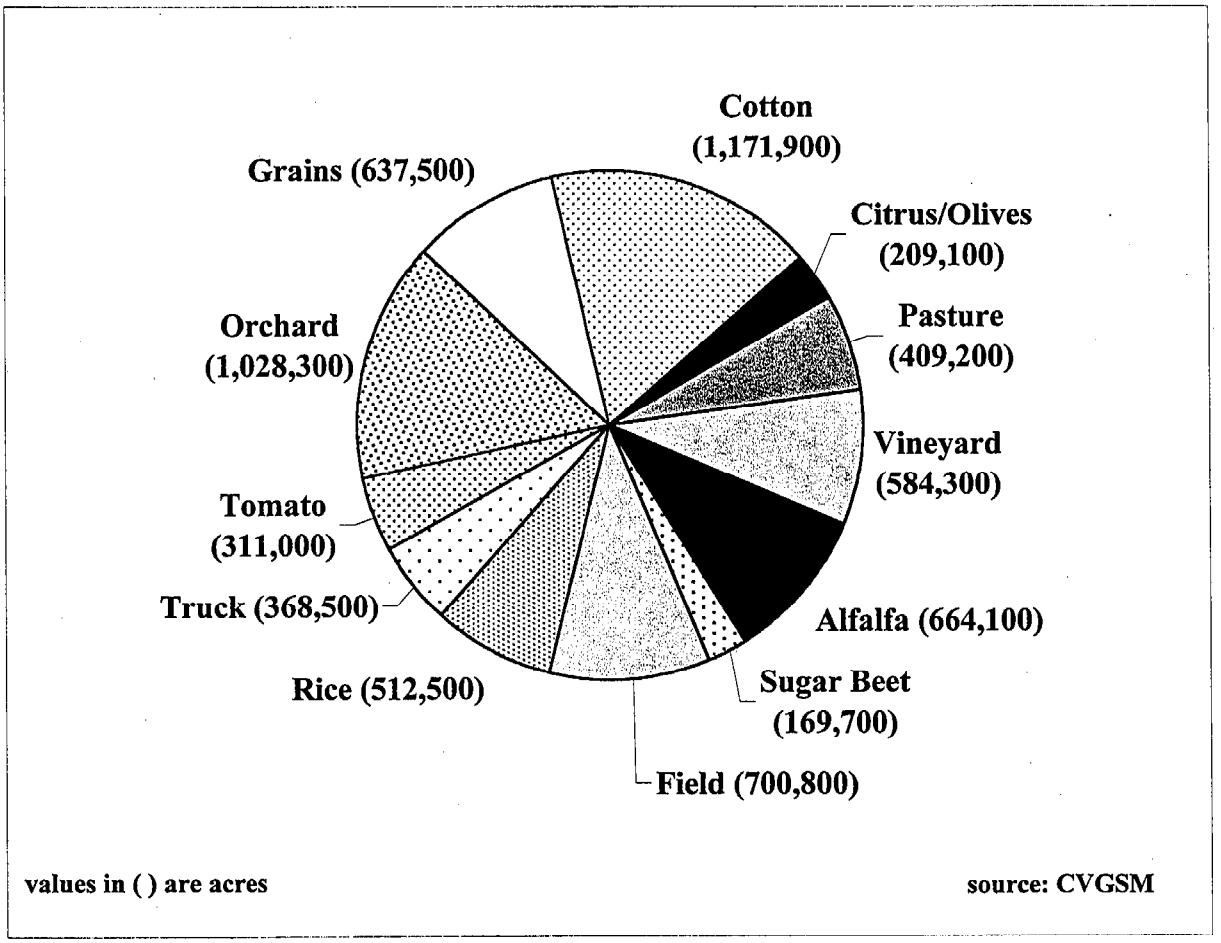


**Figure 5. Cropping Pattern,
Central Valley.**

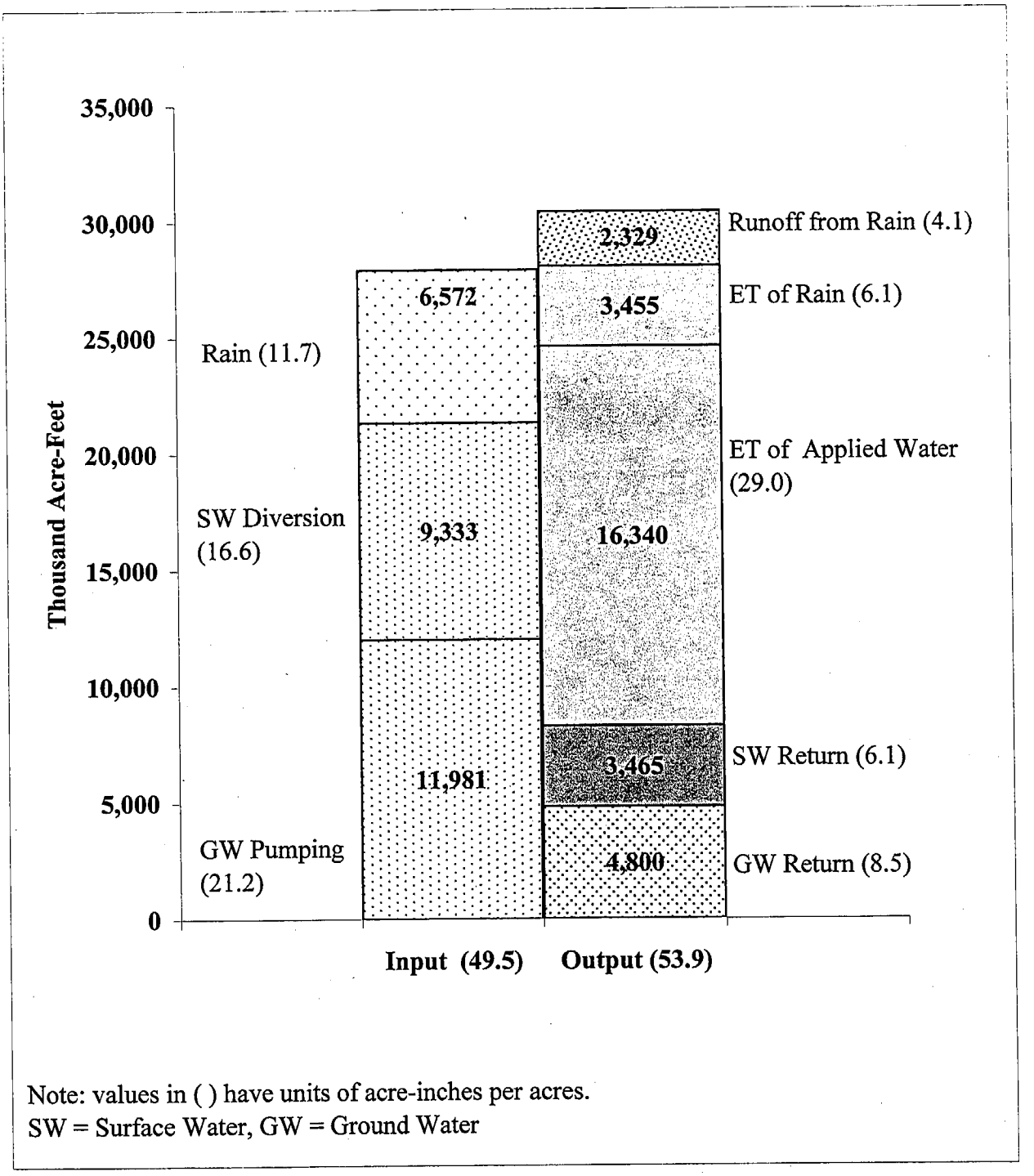


Figure 6. Overall Water Balance, Average Year, Sacramento - San Joaquin Valley.